CLAIMS:

1. Means for cooling a heated surface comprising:

a volatile liquid;

a reservoir for said volatile liquid;

enclosure means including said reservoir for containing and directing flow of the volatile liquid, said enclosure means including the heated surface;

an array of alternately oppositely charged microelectrodes positioned on the heated surface for receiving the volatile liquid and distributing said volatile liquid over said heated surface, whereby said volatile liquid is evaporated to a vapor, said array having a first end and a second end;

and metering means for connecting said reservoir to said array first end and for controlling and limiting the flow of said volatile liquid from said reservoir to said first end.

2. Means for cooling a heated surface as recited in claim 1, further providing directing means substantially coextensive with the heated surface and positioned a first distance from said heated surface for directing flow of said vapor.

3. Means for cooling a heated surface as recited in claim 2, further providing that the directing means is in the form of baffle means having a first surface facing the heated surface and a second surface facing away from the heated surface, where said second surface is positioned at an angle to said heated surface such that the distance between the array first end and the second surface is less than the distance between the array second end and the second surface, whereby liquid may flow by gravity along said second surface toward the reservoir.

4. Means for cooling a heated surface as recited in claim 2, further providing that said metering means is in the form of a flat surface positioned substantially parallel to said array first end and spaced a second distance from it, said second distance being smaller than said first distance.

5. Means for cooling a heated surface as recited in claim 4 where said second distance is less than one

millimeter.

6. Means for cooling a heated surface as recited in claim 4 where said second distance is less than 150 microns.

7. Means for cooling a heated surface as recited in claim 4, further providing that said first distance is between 1 mm and 3 mm.

8. Means for cooling a heated surface as recited in claim 4, further providing that said metering means is formed of material that is integral with said directing means.

9. Means for cooling a heated surface as recited in claim 4, further providing condensing means integral with the enclosure means.

10. Means for cooling a heated surface as recited in claim 9 where the integral condensing means is substantially parallel with the heated surface.

11. Means for cooling a heated surface as recited in claim 4, further providing condensing means external of the enclosure means, first conduit means for conveying vapor to said condensing means from the array

and second conduit means for conveying liquid from said condensing means to said reservoir.

12. Means for cooling a heated surface comprising an enclosure, an array of microelectrodes positioned on said heated surface, said array including means for accepting electrical charges of opposite polarities on adjacent microelectrodes, said array having a first end and a second end, a volatile liquid, reservoir means for receiving, holding and dispensing said volatile liquid, flow restricting means in the form of a slit formed between two substantially parallel surfaces for allowing limited flow between said reservoir and said array first end, one of said substantially parallel surfaces having positioned thereon a portion of the first end of said array whereby liquid is delivered to and distributed over the heated surface by the array and evaporated to a vapor thereby cooling said heated surface, condenser means for receiving and condensing to a liquid vapor formed by the evaporation of said liquid on the heated surface, baffle means substantially coextensive with said array for directing said vapor toward said condenser means and means for conveying said condensed liquid back to said reservoir means.

13. Means for cooling a heated surface as recited

in claim 12 where said condenser means is integral with the enclosure.

14. Means for cooling a heated surface as recited in claim 12 where the condenser means is separate from the enclosure, further including first conduit means for conveying vapor to said condenser means and second conduit means for conveying condensed liquid to said reservoir means.

15. Means for cooling a heated surface as recited in claim 12 further providing that the parallel surfaces forming the slit type flow restricting means are spaced apart by a distance between 10 and 150 microns.

16. Means for cooling a heated surface as recited in claim 12, further providing that the microelectrodes are positioned in a substantially parallel array.

17. Means for cooling a heated surface as recited in claim 12, further providing that the microelectrodes are positioned in a radial array having a more closely spaced first end and a less closed spaced second end.

18. Means for cooling a first surface comprising:

a liquid coolant;

means for distributing said liquid coolant over said first surface said distributing means comprising an array of alternately oppositely charged microelectrodes positioned on said first surface, said array having an inlet end and a second end;

means for metering said liquid coolant into said array, said metering means comprising a second surface positioned a first distance from said array, thereby forming a slit, said slit being positioned with respect to said array to include at least a portion of said inlet end of said array within said slit.

19. Means for cooling a first surface as recited in claim 18 where the distance between the first surface and the array is between 10 microns and 150 microns.

20. Means for cooling a first surface as recited in claim 18 where said liquid distributed over said first surface is evaporated to a vapor, and further including means for condensing said vapor.

21. Means for cooling a heated surface comprising an enclosure, an array of microelectrodes positioned on said heated surface, said array including means for

providing electrical charges of opposite polarities on adjacent microelectrodes, said array having a first end and a second end, a volatile liquid, reservoir means for receiving, holding and dispensing said volatile liquid, flow restricting means in the form of a slit formed between two substantially parallel surfaces for allowing limited flow between said reservoir and said array first end, one of said substantially parallel surfaces having positioned thereon a portion of the first end of said array whereby liquid is delivered to and distributed over the heated surface by the array and evaporated to a vapor thereby cooling said heated surface, condenser means for receiving and condensing to a liquid vapor formed by the evaporation of said liquid on the heated surface, baffle means substantially coextensive with said array for directing said vapor toward said condenser means and means for conveying said condensed liquid back to said reservoir means and further providing means for sensing a condition of said vapor and means for causing said sensing means to affect said electrical charge providing means.

22. Means for cooling a heated surface as recited in claim 21 further providing that said vapor condition sensing means responds to the temperature of said vapor.

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